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Risky Behavior Via Social Media: The Role of Reasoned and Social Reactive Pathways.

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Highlights

- Reactive pathway increases explained variance in willingness for risky behavior
- Prototype favourability strong predictor of willingness for risk
- Decision making may shift to more reasoned pathway in adulthood

Abstract

Objectives. It is important to understand what factors make some users of social media engage in risky activities. This under-researched area is the focus of the present study which applies the dual-process Prototype Willingness Model to demonstrate the potential role of reasoned and social reactive pathways in explaining risk behaviors in adolescents and adults in the online environment. **Design.** Quantitative single time point study using online survey data from an international sample of social media users (*N*= 1220). **Methods.** Two-step logistic regression analysis tested the predictive ability of the reactive pathway variables of the Prototype Willingness Model above and beyond reasoned pathway variables from expectancy-value models such as the Theory of Reasoned Action and Theory of Planned Behavior. **Results.** The reactive pathway variables increased explained variance in willingness to engage in online risk behaviors (compared to reasoned pathway variables alone) by a mean improvement of 6.2% across both adolescent and adult age groups. Prototype favorability (how positively or negatively an individual judges their perception of the 'typical person' to engage in a risk behavior) emerged as a particularly strong predictor of willingness to engage in online risky behavior. The predictive ability of prototype similarity (an individuals perceived similarity to the 'typical person' to engage in risk behavior) differed according to the type of risk behavior involved, with similarity on conscientiousness and extraversion appearing to have the most influence upon willingness. **Conclusions.** Reactive pathways significantly predict willingness to engage in risky behavior online across both age groups. The reactive pathway variables explained more additional variance in willingness for adolescents compared to adults suggesting that reactive processes may play a bigger part in adolescents' online risk taking; with decision making potentially shifting towards a more reasoned, analytical pathway in adulthood.

1 Introduction

Social media sites such as Facebook, Twitter, and YouTube offer opportunities for users to interact and share information not only with their friends and family but also with people who have similar interests. Over recent years the number of people using such sites has increased dramatically (Perrin, 2015) and people of all ages are permanently logged onto social media through their cell phones and mobile tablets (Peters & Allouch, 2005). However, alongside the benefits such as improved socialization and communication and enhanced learning opportunities, social media use can also pose specific risks such as cyberbullying, sexting, sending embarrassing photos, publicly sharing location, and the spread of dangerous pranks and games like the 'Choking Game' (Ahern, Sauer, & Thacker, 2015; Branley & Covey, 2017; GASP, 2013; Garner & O'Sullivan, 2010; O'Keeffe & Clarke-Pearson, 2011; Tsai, Kelley, Cranor, & Sadeh, 2010).

It is important to understand which factors may influence some users to engage in these types of risky social media practices. People might not be aware of the risks involved or they might underplay the risks associated with social media use. They might also be subject to social pressure and be influenced by whether the activity is commonplace amongst their peers. However, little is known about the role of these or other types of social cognitive factors. To fill this gap the present research adopted a dual-process framework of the type set out in the Prototype Willingness Model (PWM: Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gibbons, Gerrard, Blanton, & Russell, 1998) to predict willingness to engage in four different types of risky online activities: sharing embarrassing photos, publicly sharing one's current location, engaging in and sharing the videos of risky pranks and stunts, and engaging in sexual communication with strangers. These four behaviors were chosen as we wished to investigate risk taking behavior which reflects behaviors at the heart of social media: sharing, i.e., location sharing, photo sharing and online communication; and these behaviors have previously been linked to social media usage (Brake, 2014).

The reasoned pathway antecedents proposed in models like the Theory of Reasoned Action (TRA: Fishbein & Ajzen, 1975), Theory of Planned Behavior (TPB: Ajzen, 1991) and Fishbein's (2008) integrative model of behavioral prediction (IM) have been widely successful in predicting positive health behaviors. However they have not been as successfully applied to the prediction of negative or risky behaviors. It has been suggested that this may be due to the models being focused purely upon a reasoned, intentional pathway to risk. The PWM incorporates two different pathways to behavior: a reasoned pathway to account for risk behaviors that are planned and determined by *intentions*, and a social reactive pathway to account for unplanned or non-intentional variations in people's *willingness* to engage in risk behavior.

Dual-process models, like the PWM, are based on the assumption that there are two types of decision making involved in health behavior. The first type of decision making is analytical and based upon the idea that behavior is planned and intentional. The PWM conceptualizes this as a reasoned action pathway similar to that described in models such as the TRA (Fishbein & Ajzen, 1975), TPB (Ajzen, 1991) and the IM (Fishbein, 2008). Antecedents of this reasoned pathway which have been shown to account for a considerable proportion of the variance in a range of health behaviors include people's *attitudes* towards the behavior (e.g., whether the individual perceives the behavior as positive or negative) and their perceptions of the social pressures to perform or not perform a behavior – which as outlined in the IM can be a function of both *injunctive norms* (perceptions of whether the behavior is approved or disapproved by others) and *descriptive norms* (whether others are engaging in the behavior).

Reasoned pathway models suggest that if an individual holds positive attitudes towards a behavior, feels that others approve the behavior and/or has peers that engage in the behavior – they will be more likely to engage in that behavior themselves.

The second type of decision making is heuristic based and based upon the idea that risk behavior may not always be volitional but influenced by a more emotional reactive response to a given situation. The PWM conceptualizes this as a social reactive pathway whereby people can be willing to engage in a behavior without necessarily having a plan to engage in that behavior. It suggests that willingness is determined by people's images or prototypes they have about the type of person who engages in that activity (e.g., the 'typical' smoker, drinker, or social media user who does dangerous pranks). If people view the prototypical person in a positive light (*prototype favourability*), they will be more willing to engage in the behavior, particularly if they perceive themselves to also be similar to that individual (*prototype similarity*). Gibbons, Gerrard, Reimer, & Pomery (2006) emphasize that individuals are aware that by engaging in the behavior they will also gain some of the negative characteristics that they attribute with the prototype and therefore these prototypes should not be regarded as aims or 'goals' (which is in contrast to intention which generally represents 'goal states'; Ajzen, 1991). Instead, willingness is based upon an individual's overall *heuristic* evaluation of the prototype and their social situation.

Given adolescents' sensitivities about their image, the PWM has generally been applied to explaining why young people engage in a range of health-risk activities such as smoking (Gerrard, Gibbons, Stock, Lune, & Cleveland, 2005; Hukkelberg & Dykstra, 2009), alcohol consumption (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997; Davies, Martin, & Foxcroft, 2013; Rivis et al., 2006; Spijkerman, van den Eijnden, Vitale, & Engels, 2004; Zimmermann & Sieverding, 2010), and unsafe sex (Myklestad & Rise, 2007). A couple of recently published studies have also demonstrated the model's contribution towards explaining two specific types of online risk behavior in adolescents: sexting (Walrave et al., 2015) and self-disclosure about peer relationships (Van Gool, Van Ouytsel, Ponnet, & Walrave, 2015). However, risk behaviors are not restricted to adolescents, many adults also engage in risky behavior; although it is possible that there may be differences in the type of risk behavior and/or the factors underlying that behavior. For example, it has been suggested that age differences in risk behaviors may be more prevalent for risks involving emotive, reactive responses but for risks which are part of a 'cold', more reasoned process there may not be any differences in prevalence between adolescents and adults (Figner & Weber, 2011) As adult social media users are also putting themselves at risk online (e.g., more than 30% of adult users have been found to have at least one application that is sharing their location online to others; Brake, 2014) it is important not to limit our analysis to young people. This study therefore explores the antecedents of willingness to engage in online risky behavior in both adult (20 years and over) and adolescent (19 years and under) social media users.

In this study we were particularly interested in testing the extent to which antecedents unique to the social reactive pathway (i.e., prototype favorability and prototype similarity) could enhance the prediction of willingness to engage in the four types of risky activities on social media above and beyond reasoned pathway antecedents (i.e., attitudes, injunctive norms, descriptive norms, and previous behavior). Social media users were presented with four hypothetical scenarios to exploring their perceptions, attitudes and willingness to engage in the risk behavior. Of course, the degree of enhancement that the social reactive pathway components provides could vary according to the type of risky activity being predicted. The original premise of the model is that the PWM has particular value in explaining high risk

impulsive behaviors – which applies to a lesser or greater extent across the four activities. For example, sharing ones location or embarrassing photos on social media might be considered less risky than engaging with sexual communications with a stranger or engaging in and sharing videos of risky pranks and stunts. Comparison between age groups also enabled us to examine the extent that reactive-based decision processes may be exclusive to adolescents or whether they appear to continue into adulthood.

2 Method

2.1 Sample and survey methodology

A single time point online survey provided data from a diverse sample of 1102 international social media users from 77 countries; with the majority of participants from the UK, Ireland, USA and Canada (refer to Appendix A for complete demographics). Participants were aged between 13 and 80 years (M = 28.5 years, SD = 11.3 years); 69.7% were female and 30.3% were male. The bias towards female participants appears to be representative of social media users (Kimbrough, et al., 2013). Although findings suggest that this gender difference is diminishing (Perrin, 2015), excluding results from online forums, there still appears be more females using many of the social media platforms (e.g., Duggan et al., 2014; Hargittai, 2007; Madden & Zickuhr, 2011). However, it is also possible that the greater amount of female participants could – at least partially – be due to a gender difference in responding to questionnaires (e.g., Hill, Roberts, Ewings, & Gunnell, 1997). Although there were more females than males in the sample, males still accounted for more than 30% of the sample; therefore this gender difference was not considered problematic.

The survey was designed by the authors, reviewed by an expert within the field of social media research and received ethical approval from the Durham University ethics committee. The survey was also piloted on a small sample of participants via opportunistic sampling and feedback was obtained regarding the clarity of the survey items and any difficulties encountered by the participants. The survey was revised following this feedback and all necessary amendments were made and piloted prior to recruitment. To help maintain participants interest and to encourage completion of the entire survey, interesting and/or humorous facts were displayed throughout the survey (Branley, Covey, & Hardey, 2014). To be eligible to participate, users were required to be fluent English speakers and to have accessed social media at least once in the last 3-month period. Almost 75% of the sample reported using social media more than several times per day (Appendix B). All minors (<16 years) were recruited through schools and parental and participant consent was obtained prior to participation. Minors completed the survey outside of school time. Adults were recruited online via a range of social media channels (see Appendix C). As compensation for their time, all participants had the option to enter a free prize draw for a £50 Amazon voucher. Within this sample there were some surveys with incomplete data. This missing data was tested for randomness using Little's MCAR (Missing Completely At Random) test. The results were non-significant indicating that the data was missing completely at random. Consequently, the missing data were addressed using Maximum Likelihood Estimation which has been shown to be a reliable method for dealing with missing data, superior to the deletion of incomplete cases (Enders & Bandalos, 2001).

2.2 Measures and scoring

2.2.1 Risk Behavior Scenarios

Participants were presented with four different scenarios, each depicting one of the following online risk behaviors:

1. Sharing embarrassing photos:
   "Kirsty and her friends find it funny to upload embarrassing photos of each other to Facebook. Although Kirsty is embarrassed by the photos posted of her, she just accepts it as a joke. Kirsty does not use her privacy settings so her Facebook profile is openly accessible to everyone, she does not change her settings to stop her friends posting these photos, nor does she delete the photos from her Facebook account"

2. Publicly sharing current location:
   "Alex loves to use social media to let his friends know where he is and what he is currently doing, for example he often openly shares the location of the coffee shop or bar that he is currently at, so that anyone who is nearby can join him for a drink"

3. Engaging in and sharing the videos of risky pranks and stunts:
   "Tom and his friends are playing a game known as 'Planking'. The aim is to try to lay straight, like a plank of wood, in the most original or difficult place. They aim to have the best, craziest and/or funniest photo, which they share openly through Social Media"

4. Engaging in sexual communication with strangers:
   "Rebecca 'met' Ian online when he sent her a friend request through Facebook. She accepted his request and they have been messaging each other and chatting online regularly. Rebecca really likes Ian and he has told her that the feeling is mutual, both have expressed an interest in dating and they plan to meet within the next fortnight. Rebecca and Ian have privately exchanged photos including some photos of a mild sexual nature"

2.2.2 Willingness (DV)

The dependent variable, willingness, was measured by asking participants if they were in the same situation as the person in the scenario, how willing would they be to engage in the risk behavior (e.g., If you were in the same scenario as Alex, how willing would you be to share your location openly through Social Media?). This was rated on a scale of 1 (very unwilling) to 5 (very willing). This is a similar measure to that used by Pomery, Gibbons, Reis-Bergan, & Gerrard (2009).

The following items were used to measure predictors of willingness:

2.2.3 Attitude

Attitude towards the behavior was scored by calculating a perceived benefit-risk score. Participants were asked the following two questions: "If you did [behavior featured in the scenario], how beneficial do you think it would be for you personally?" and "If you did [behavior featured in the scenario], how risky do you think it would be for you personally?" E.g., "If you shared your location openly through Social Media, how beneficial do you think it would be for you personally?" These items were scored on a Likert-type scale from 1 (not at all beneficial/risky) to 5 (extremely beneficial/risky). Perceived benefit-risk score was then calculated by subtracting perceived risk from perceived benefit, therefore negative values

represented a negative attitude towards the behavior and positive values represent a positive attitude towards the behavior. Whilst some studies have relied upon a single measure of attitude (e.g., (Rivis, Sheeran, & Armitage, 2006), we included two measures – one to capture the benefits of the behavior and one to capture the perceived risks of the behavior, and deducted risks from benefits to create a difference score.

2.2.4 Injunctive norms

Injunctive norms were measured by asking participants to rate the extent to which they agreed with the following statement: "People who are important to me think that I should take part in this type of behavior". Participants responded using a Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). This is the same single item measure of subjective norms used by (Rivis, Abraham, & Snook, 2011)

2.2.5 Descriptive norms

Descriptive norms were measured using one item "As far as you are aware, have any of your friends ever [behavior] on/through Social Media?" E.g., "As far as you are aware, have any of your friends ever shared their current location openly through Social Media?" Responses were scored on a scale from 0 – 3: 0 (No – they have never shared their current location through Social Media), 1 (Yes – they have shared their current location through Social Media but only with friends that they also know offline), 2 (Yes – they have shared their current location through Social Media including sometimes with friends that they only know online, 3 (Yes - they have shared their current location openly through Social Media so that anyone could see it).

2.2.6 Past behavior

Past behavior was measured using the item "Have you ever [behavior] on/through Social Media? E.g., "Have you ever shared your current location through Social Media?". Responses were scored on a scale from 0 – 3: 0 (No – I have never shared my current location through Social Media), 1 (Yes – I have shared my current location through Social Media but only with friends I also know offline), 2 (Yes – I have shared my current location through Social Media including sometimes with friends I only know online), 3 (Yes - I have shared my current location openly through Social Media so that anyone could see it.

2.2.7 Prototype favorability

Favorability towards the prototype was measured using the item "Do you think [name of person in scenario] is a likeable person?" (E.g., 'Do you think Alex is a likeable person?'). This item was measured on a Likert-type scale from 1 (very unlikeable) to 5 (very likeable). This is similar to the single item favorability measure used by Rivis et al. (2011).

2.2.8 Prototype similarity

This study applied a novel approach to measuring prototype similarity. Previous research has relied upon a single item measure explicitly asking participants to rate how similar they feel they are to the risk taker/prototype in a given scenario (e.g., Rivis et al., 2006). This could create response bias. In this study a more objective measure of similarity was obtained by asking participants to rate the prototype's personality traits using the Ten Item Personality Inventory (TIPI; Gosling, 2003). The scale showed good internal reliability with Cronbach's Alpha scores of: .80 for Extraversion, .74 for Agreeableness, .84 for Conscientiousness, .81 for Emotional Stability and .80 for Openness. This was then compared with their own personality scores (also using the TIPI) to calculate a similarity score. Similarity was scored

by calculating the difference between the participants' own scores on the TIPI and the scenario rated scores for each of the five personality traits: Extraversion, Agreeableness, Conscientiousness, Emotional Stability/Neuroticism, and Openness. The five difference scores were then summed to create an overall difference score. This was then deducted from 20 (the largest difference score possible) to reverse the scores into a similarity score, i.e., high scores represent high similarity and low scores represent low similarity.

As Gibbons et al. (1998) suggest that the strength of prototypes will be greatest when users perceive the prototype as similar and as favorable, the interaction between the two variables is also included, i.e., prototype similarity x prototype favorability.

2.3 Analysis

Two-step logistic regression analysis was used to assess whether the reactive pathway antecedents (i.e., prototype similarity, prototype favorability) enhanced the prediction of willingness to engage in online risk, above and beyond the reasoned pathway components (i.e., attitudes, injunctive norms, descriptive norms and previous behavior). The first step therefore included past behavior, attitudes and injunctive norms and descriptive norms. The second step introduced the prototype variables (prototype similarity and prototype favorability). As Gibbons et al. (1998) suggest that the strength of prototypes will be greatest when users perceive the prototype as similar and as favorable, the interaction between the two variables was also included in the second step (prototype similarity x prototype favorability). To compare the predictive ability of the reasoned and reactive components between adolescents and adults the regressions were run separately for respondents aged 19 years or under (N=258) and respondents aged 20 years or over (N=844). Refer to Appendix A for full sample demographics.

3 Results

Prior to running the regression analyses, descriptive statistics were computed to confirm that there was adequate variance on the dependent variable and predictors for both age groups (i.e., there was no evidence that participants were all selecting the same value on the scale, such as floor or ceiling effects). The results shown in Table 1.

<< INSERT TABLE 1 HERE >>>

Checking for multicollinearity also revealed no cause for concern, with most correlations between the predictors < .4 (Table 2). Multicollinearity was also tested during the regression analyses and all VIF values were low (<5).

<< INSERT TABLE 2 HERE >>>

As shown in Table 3 the regression showed that the variables entered at step 1 (attitudes, injunctive norms, descriptive norms and previous behavior) were highly significant, positive predictors of willingness across all four risk behavior scenarios. This applied to both age groups. Overall these variables accounted for between 26.2 – 53.1% of the variance in willingness to engage in the risk behavior.

Introducing the prototype variables in step 2 resulted in a significant increase in explained variance across almost all of the scenarios for both age groups, with the exception of scenario 1 where the increase did not reach significance for adolescents Overall, across all of the

scenarios, explained variance was increased slightly more in adolescents (4.6-13.7%) than it was in adults (2-10.7%).

The overall model explained higher total variance in willingness [to engage in risk behavior] for the adult age group compared to the adolescent age group, across 3 of the 4 scenarios (sharing embarrassing photos, sharing location and sharing sexual content). However, the majority of this difference is accounted for by the attitudes and norms variables that were entered in the first step of the regressions. The *difference* in explained variance between the first and second steps in the regression (i.e., as a consequence of the introduction of the reactive prototype-based variables prototype similarity and prototype favorability) was generally greater for the adolescent group (Table 3).

<< INSERT TABLE 3 HERE >>

Of the two prototype variables, prototype favorability emerged as the most consistent predictor of willingness. Favorability was a significant predictor of willingness across both age groups and all four behavior scenarios. In comparison, the significance of prototype similarity (and the interaction between prototype favorability and similarity) differed according to the risk behavior and age group involved (Table 3). In order to explore this further, additional regression analyses were carried out for each of the personality traits individually. This allowed us to investigate how each of the personality traits interact with similarity ratings and their effect upon willingness to engage in risk behavior. Of the five personality traits, conscientiousness was the only trait to be significant in at least one of the two age groups, across all four scenarios. Extraversion was significant in at least one of the age groups for three of the four scenarios. Suggesting that similarity on extraversion and conscientiousness may play a greater role in willingness to engage in risk behavior, than some of the other personality traits. This may be a direct or indirect effect (the latter via an interaction with perceived favourability) dependent upon the risk behavior in question. For example, when investigating willingness to share (or tolerate) embarrassing photos online, individuals were more willing to tolerate such photos if they were similar on conscientiousness, but only if they also judged the prototype favorably. Whereas for sharing location publicly online, adults were more willing to do so if they perceived themselves to be similar to the prototype for ratings of conscientiousness, regardless of whether they perceived the prototype to be favorable or not.
The remaining personality traits (agreeableness, emotional stability and openness) did play a role to a lesser degree. The results are shown in full in Table 4.

<< INSERT TABLE 4 HERE >>

4 Discussion

This study aimed to investigate the factors underlying social media users' willingness to engage in four different types of online risk behaviors, and to evaluate the predictive ability of the social reactive pathway to risk proposed by the PWM. The reactive pathway variables showed predictive ability above and beyond the reasoned pathway antecedents (such as those derived from the TRA, TPB and integrative model, i.e., attitudes, previous behavior and descriptive and injunctive norms) for all four risk behaviors (although the increase in explained variance for scenario 1: sharing embarrassing photos did not reach significance for the adolescent age group).

Of the variables unique to the PWM, the increase in explained variance in willingness appears to be mainly due to the *prototype favorability* factor, i.e., how favorably individuals judge others who engage in the specific risk behavior. This differs to findings by Rivis et al. (2006) who found a similar increase in predictive ability for the PWM variables (in relation to drinking behavior, unhealthy food consumption and smoking) but found prototype similarity to be the more reliable predictor. It is possible that this is due to assessing the PWM in relation to different risk behaviors, or due to Rivis et al. using intention as their dependent variable rather than willingness. As the reactive pathway of the PWM is designed to explain willingness this was chosen as the most appropriate outcome variable for the current study. Todd, Kothe, Mullan, & Monds (2016) recent review suggests that prototype favorability has a relationship on behavior through willingness whereas prototype similarity appears to demonstrate a stronger relationship with intention rather than willingness. The latter is unexpected as the PWM proposes that both prototype variables influence behavior *through* willingness (which in turn can impact intention) and the model does not include a pathway directly through intention. However, a direct pathway to intention may explain why Rivis et al. found similarity to be the more significant predictor. Future research should seek to determine which factors influence behavior through willingness and which may have a more direct route via intention. It is acknowledged that future studies could benefit from the inclusion of a measure of intention (in addition to measuring willingness) to allow full testing of the PWM and comparison to other models such as the reasoned action approach. It is also possible that some online risk behaviors may be more reasoned in nature than others, e.g., sharing location online for perceived benefits of making location known to others. Therefore intention may explain these behaviors more than willingness alone. It is also worth noting that the current study used a novel measure of prototype similarity, which may also account for some of the differences in the predictive ability of this factor compared to previous studies. Whereas previous studies have generally relied upon self-reported impressions of similarity (e.g., "In general, how similar are you to the type of person who drinks four units of alcohol and drives thereafter?", Rivis et al., 2011), these measures may be prone to response bias. Similarity is a relatively abstract concept therefore the current study aimed to include a potentially more objective measure of similarity by asking participants to rate the prototypes on personality trait measures (using the TIPI). These measures were then compared to their own personality trait measures to create a similarity/difference score. As no statements about similarity or comparisons were provided to the participants, this method may be less likely to introduce response bias. However it is possible that the current study and previous research measures of similarity are tapping into slightly different constructs. Interestingly, the inclusion of personality traits as a measure of similarity allowed us to run further analyses to investigate whether some personality traits play a stronger role [compared to others] in relation to willingness to engage in risk. The results suggest that similarity on conscientiousness and extraversion may influence willingness to engage in online risk to a greater degree than the other personality traits. The results also indicate that the predictive ability of specific traits varies according to the risk behavior involved. Further research may wish to investigate this in more detail.

Descriptive norms were found to be a weak predictor of willingness with the exception of one of the scenarios which depicted engaging in dangerous pranks and sharing the videos online. This may suggest that the role of descriptive norms as a predictor of willingness differs according to the risk behavior in question. For example, this scenario depicted a potentially more obvious physical risk (e.g., balancing on high objects, lying in the middle of the road) compared to the other scenarios (e.g., sharing location online, sharing sexual content, or sharing embarrassing photos) where the risk may be less immediately apparent and/or of a

potentially less physical nature. Alternatively it is possible that descriptive norms have more of an effect upon behavior through intention rather than willingness. This is another potential avenue for future research incorporating an intention and willingness measure. Future research may also wish to include a wider range of online behaviors and predictors, to identify if the type of behavior and/or nature of the associated risk impacts upon the predictive value of each of the variables.

The second aim of this research was to investigate the predictive ability of the reactive pathway to willingness to engage in risk for adolescents and adults. The overall model (including both the reasoned and reactive variables) explained more variance in willingness for the adult age group. A finding that may initially seem surprising considering the PWM was designed to explain risk behavior in adolescents (Gerrard et al., 2008; Gibbons et al., 1998). However, further investigation shows that the higher percentage of explained variance in willingness in adults is accounted for by the reasoned variables - attitudes and injunctive norms in particular. The addition of the reactive prototype-based variables (prototype similarity and prototype favorability) actually showed a greater increase in explained variance in willingness for the adolescent group. This is an important finding because it suggests that factors relating to the more rational pathway may play a greater role in adults willingness to engage in risk; supporting Gerrard and colleague's (2008) theory that adolescents' greater willingness to engage in risk behavior is due to decision-making shifting to a more reasoned, analytical process with age. That said, the social reactive variables still significantly increased explained variance in adult willingness to engage in behavior, above and beyond that explained by the reasoned action variables based purely upon rational decision-making pathways; suggesting that reactive pathways to risk may still play a role in adult social media users' willingness to engage in risk taking in the online environment (albeit to a lesser extent than adolescent users). It is important to note that the current study is based upon single time point survey data and does not include a measure of actual risk behavior. In order to further investigate the role of reactive processes and willingness to engage in risk behavior, future research should include a measure of subsequent behavior.

Due to space and time constraints and a desire to limit participant dropout rates, single item measures were used in the current study. Whilst there may be advantages using multi-item measures, the use of single item measures was not deemed problematic as many previous studies investigating the PWM have applied such measures (e.g., willingness: Pomery et al. 2009; favorability: Rivis et al. 2011; 2006; norms: Rivis et al., 2011. It has also been demonstrated that single item measures can be sufficient for constructs that are "easily and uniformly imagined" and in many instances more items can provide little additional information, with one or two clear measures being able to outperform some scales with multiple items (Bergkvist & Rossiter, 2007; Drolet & Morrison, 2001).

We acknowledge that the specific wording and details of the 'risk scenarios' provided in the survey may have influenced respondents' responses. However this does not undermine the internal validity of the current study because we were interested in whether the respondents' perceptions of likeability and similarity relate to their willingness to engage in a similar activity. However, future research wishing to draw further conclusions about the general factors underlying such behaviors should seek to ensure neutrality of the wording used within the scenarios. Also, it may be worth clarifying the audience more specifically in future research as users may imagine different social media platforms when answering the items about the hypothetical scenarios. Although the current study did specify that the scenarios depicted information that users were sharing openly/publicly, the specific platform may still

influence the degree to which users really regard content as 'public', for example Twitter is often regarded as more public compared to the more "private-public" of Tumblr (Branley, 2015).

It has been suggested that prototype images do not need to consist solely of images of the type of person engaging in the behavior, but may also involve prototypes of risk-*avoiders*, i.e., the type of person who does *not* engage in the behavior, for example the type of person who never drinks alcohol (Gerrard et al., 2008). Therefore future research may wish to include ratings of abstainer prototypes in addition to risk-taker prototypes. Other factors may also affect the decision to engage in risky online behavior, for example future studies may wish to control for variables such as race/ethnicity, gender, time spent online etc. It is also possible that country of origin may influence online behavior, due to cultural and legal differences (e.g., legislation regarding online privacy).

Implications for practice include awareness that interventions to increase rational processing of the behavior may be beneficial. For example, specific warnings could be posted on video uploading services like YouTube to ensure that the users are making a conscious decision about posting the content and who they are sharing the content with. This could include the use of alerts such as "Are you sure you want to share this video online so that anyone can view it?" Or posters could be asked to confirm the specific privacy settings they want for all videos they are uploading rather than relying on default setting (i.e., do they want to share it with just their friends, specified users, or with everyone?). A similar style of intervention has been proposed by Turel & Qahri-Saremi (2016) who identify that this may be a more appropriate style of intervention for spontaneous, problematic usage of social networking sites rather than interventions that assume rational planning underlies all behavior (e.g., theory of planned behavior interventions). Turel & Qahri-Saremi also suggest that levels of cognitive-behavioral control may affect excessive or inappropriate use of social networking sites, it is possible that a similar mechanism underlies engagement in risky behavior *within* the online environment. Future studies may wish to include a measure of cognitive-behavioral control.

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Appendices

Appendix A. Sample demographics

Appendix B. Reported social media usage

Appendix B. Sources for recruitment

Appendix A. Sample demographics (N = 1102). Adolescents 13-19 years (n = 258), Adults ≥ 20 years (n = 844).

		Adolescents	Adults	Total
Country	United Kingdom & Ireland	152 (58.9%)	421 (38.2%)	573 (52%)
	United States of America	59 (22.9%)	182 (21.6%)	241 (21.9%)
	Canada	12 (4.7%)	48 (5.7%)	60 (5.4%)
	Germany	3 (1.2%)	20 (2.4%)	23 (2.1%)
	Australia	5 (1.9%)	14 (1.7%)	19 (1.7%)
	India	2 (0.8%)	15 (1.8%)	17 (1.5%)
	China	4 (1.6%)	8 (0.9%)	12 (1.1%)
	Other (69 countries, each <1%)	21 (8.1%)	136 (16.1%)	157 (14.2%)
Gender	Male	58 (22.5%)	276 (32.7%)	334 (30.3%)
	Female	200 (77.5%)	568 (67.3%)	768 (69.7%)
Age	*M*	17.1 yrs	32 yrs	28.5 yrs
	SD	1.8 yrs	10.7 yrs	11.3 yrs

Appendix B. Reported social media usage. Adolescents 13-19 years (n = 258), Adults ≥ 20 years (n = 844).

	Adolescents	Adults	Total
Frequency of access			
Once per week or less	9 (3.5%)	24 (2.8%)	33 (3%)
A few times per week	10 (3.9%)	73 (8.6%)	83 (7.5%)
Once or twice per day	29 (11.2%)	138 (16.4%)	167 (15.2%)
Several times per day	139 (53.9%)	453 (53.7%)	592 (53.7%)
Several times per waking hour	71 (27.5%)	156 (18.5%)	227 (20.6%)
Total duration of access per week			
Up to 4 hours	53 (20.5%)	245 (29%)	298 (27%)
5 – 7 hours	59 (22.9%)	213 (25.2%)	272 (24.7%)
8 – 14 hours	45 (17.4%)	192 (22.7%)	237 (21.5%)
15 – 20 hours	50 (19.4%)	102 (12.1%)	152 (13.8%)
Over 21 hours	51 (19.8%)	92 (10.9%)	143 (13%)

Appendix C. Sources for recruitment.

1. Websites and forums: e.g., GradCafe, Social Research Forum, The StudentRoom.
2. Dedicated participation sites: e.g., Social Psychology Network, Online Psychology Research.
3. Social media including Facebook, Twitter, Instagram and LinkedIn (including LinkedIn research interest groups, e.g., PhD survey support, Psychology students, PhD students, Academia PhD network)
4. Mailing lists: e.g., Association of Internet Researchers mailing list and Psychology Postgraduate Affairs Group mailing list.
5. University student participation pool: A university provided website that allows postgraduates to advertise their studies to undergraduate students, who can participate to gain credits necessary to pass to the next stage of their degree.

Table 1. Means (and standard deviations) for the dependent variable and predictors across all scenarios, split by age. Adolescents 13-19 years (n = 258), Adults ≥ 20 years (n = 844).

	Embarrassing photos		Sharing location		Videos of pranks		Sexual communication	
	Adolescents	Adults	Adolescents	Adults	Adolescents	Adults	Adolescents	Adults
Willingness (DV)	1.69 (0.87)	1.44 (0.76)	2.46 (1.09)	2.45 (1.15)	2.75 (1.24)	2.45 (1.15)	1.45 (0.80)	1.60 (0.93)
Attitudes	-2.13 (1.42)	-2.41 (1.53)	-1.07 (1.46)	-0.89 (1.54)	-0.48 (1.33)	-0.89 (1.44)	-2.74 (1.47)	-2.48 (1.61)
Injunctive Norms	1.78 (0.90)	1.56 (0.86)	2.25 (0.91)	2.20 (1.00)	2.05 (0.93)	1.73 (0.96)	1.31 (0.71)	1.36 (0.78)
Descriptive Norms	0.67 (0.88)	0.99 (0.78)	1.86 (0.93)	1.93 (0.93)	0.65 (.76)	0.36 (0.63)	1.08 (1.05)	1.00 (1.05)
Past Behavior	0.16 (0.78)	0.54 (0.66)	0.94 (0.87)	0.93 (0.93)	0.14 (0.41)	0.06 (0.27)	0.57 (0.82)	0.55 (0.85)
Prototype Similarity	13.28 (2.85)	13.34 (2.85)	14.09 (3.09)	14.44 (3.01)	13.59 (2.95)	13.94 (3.07)	13.61 (2.48)	14.10 (2.86)
Prototype Favorability	3.12 (0.84)	3.00 (0.78)	3.55 (0.85)	3.40 (0.84)	3.34 (0.83)	3.27 (0.79)	2.83 (0.82)	3.03 (0.70)

Table 2. Bivariate correlations between the predictors for all 4 scenarios (N = 1102). S1 = embarrassing photos, S2 = sharing location, S3 = Videos of pranks, S4 = Sexual communication.

	Willingness (DV)	Attitudes	Injunctive Norms	Descriptive Norms	Past Behavior	Prototype Similarity
Attitudes	S1) .485**					
	S2) .579**					
	S3) .407**					
	S4) .475**					
Injunctive Norms	S1) .427**	S1) .354**				
	S2) .547**	S2) .456**				
	S3) .437**	S3) .333**				
	S4) .443**	S4) .366**				
Descriptive Norms	S1) .158**	S1) .062*	S1) .104**			
	S2) .160**	S2) .073*	S2) .110**			
	S3) .367**	S3) .146**	S3) .259**			
	S4) .248**	S4) .056	S4) .136**			
Past Behavior	S1) .398**	S1) .226**	S1) .225**	S1) .446**		
	S2) .536**	S2) .348**	S2) .366**	S2) .399**		
	S3) .291**	S3) .084**	S3) .277**	S3) .356**		
	S4) .499**	S4) .202**	S4) .229**	S4) .478**		
Prototype Similarity	S1) .080**	S1) .028	S1) .056	S1) .009	S1) .067*	
	S2) .181**	S2) .090*	S2) .212**	S2) -.024	S2) .054	
	S3) .314**	S3) .078**	S3) .254**	S3) .155**	S3) .147**	
	S4) .129**	S4) .122**	S4) .136**	S4) -.013	S4) .043	
Prototype Favorability	S1) .260**	S1) .088**	S1) .203**	S1) .106**	S1) .229**	S1) .189**
	S2) .318**	S2) .180**	S2) .280**	S2) .039	S2) .196**	S2) .185**
	S3) .398**	S3) .128**	S3) .219**	S3) .185**	S3) .165**	S3) .196**
	S4) .283**	S4) .079**	S4) .181**	S4) .097**	S4) .180**	S4) .262**

Note: *** p<.001, ** p<.01, * p<.05.

Table 3. Standardized coefficients for the two-step regression analysis. Adolescents 13-19 years (n = 258), Adults ≥ 20 years (n = 844).

	Scenario 1: Embarrassing photos				Scenario 2: Sharing location			
	Adolescents		Adults		Adolescents		Adults	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Attitudes	.241***	.242***	.376***	.367***	.341***	.336***	.341***	.332***
Injun. Norms	.155**	.132*	.270***	.223***	.280***	.258***	.272***	.232***
Past Beh.	.359***	.306***	.236***	.207***	.268***	.247***	.343***	.328***
Desc. Norms	.047	.055	-.032	-.034	.071	.079	-.052*	-.046
Extra.		.050		.071		.030		.033
Agree.		.010		.024		.082		-.005
Conscien.		-.111		-.161***		.001		-.021
Emot.		-.011		-.033		-.014		-.042
Open.		-.014		.038		-.005		-.012
P. Similarity		.054		.011		-.033		.104**
P. Favorability		.110*		.128***		.209***		.092***
P. Sim. x Favor		.142**		.063*		-.076		.040
Adj R^2	.311	.332	.391	.421	.469	.508	.531	.547
R^2 change		.041		.035***		.054**		.020***
F value	30.03***	11.63***	136.46***	52.02***	57.66***	23.15***	239.94***	85.97***

Note: *** p<.001, ** p<.01, * p<.05.

	Scenario 3: Sharing videos of pranks				Scenario 4: Sexual communication			
	Adolescents		Adults		Adolescents		Adults	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Attitudes	.206***	.206***	.308***	.300***	.202**	.219***	.332***	.323***
Injun. Norms	.284***	.152**	.251***	.197***	.138*	.086	.269***	.232***
Past Beh.	.201***	.140**	.080*	.070*	.393***	.384***	.367***	.346***
Desc. Norms	.288***	.197***	.183***	.118***	-.017	-.040	.027	.026
Extra.		.022		.087*		-.034		.001
Agree.		.040		.001		.086		-.038
Conscien.		-.078		-.009		-.153		-.092*
Emot.		.142*		-.047		-.004		.005
Open.		.048		.172***		-.109		.007
P. Similarity		.061		.042		.130*		.034
P. Favorability		.314***		.206***		.166**		.146***
P. Sim. x Favor		-.044		.002		-.003		.062*
Adj R^2	.329	.451	.325	.427	.262	.315	.493	.521
R^2 change		.137***		.107***		.073**		.032***
F value	32.55***	18.61***	102.55***	53.32***	23.86***	10.84***	205.82***	77.28***

Note: *** $p<.001$, ** $p<.01$, * $p<.05$. Key: Injun Norms = injunctive norms; Desc. Norms = descriptive norms; Extra = extraversion; Agree = agreeableness; Conscien = Conscientiousness; Emot = emotional stability; P = prototype; Sim = Similarity; Favor = Favorability

Table 4. Standardized coefficients for the two-step regression analyses testing each personality trait individually. Adolescents 13-19 years (n = 258), Adults ≥ 20 years (n = 844).

Scenario 1 (Embarrassing photos)	Step 1		Step 2 with personality trait									
			Extra.		Agree.		Consc.		Emot.		Open	
	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult
Attitudes	.241***	.376***	.252***	.383***	.228***	.374***	.241***	.353***	.249***	.376***	.236***	.379***
Injunc. Norms	.155**	.270***	.146*	.246***	.142*	.241***	.144*	.222***	.134*	.240***	.131*	.245***
Past Beh.	.359***	.236***	.333***	.211***	.327***	.216***	.302***	.209***	.339***	.212***	.329***	.214***
Desc. Norms	.047	-.032	.039	-.033	.048	-.036	.051	-.035	.056	-.032	.054	-.035
Personality	-	-	.007	.020	-.002	-.020	-.052	-.084*	-.036	-.048	-.030	-.007
P. Sim.	-	-	.023	-.003	-.027	-.026	.036	.043	.040	.005	.004	-.013
P. Favor.	-	-	.115*	.129***	.138*	.132***	.131*	.143***	.112*	.131***	.131*	.131***
P. Sim. x Favor.	-	-	.142**	.045	-.051	.033	.111*	.073**	.105	.002	.068	.022
Adj R^2	.311	.391	.336	.407	.317	.407	.330	.418	.328	.406	.319	.405
R^2 change	-	-	.035*	.018***	.017	.018***	.029*	.030***	.027*	.018***	.018	.016***
F value	30.03***	136.46***	17.26***	73.19***	15.94***	73.22***	16.81***	76.74***	16.66***	73.10***	16.06***	72.69***

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Scenario 2 (Sharing location)	Step 1		Step 2 with personality trait									
			Extra.		Agree.		Consc.		Emot.		Open	
	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult
Attitudes	.341***	.341***	.336***	.334***	.343***	.336***	.339***	.332***	.328***	.333***	.340***	.336***
Injunc. Norms	.280***	.272***	.251***	.238***	.251***	.240***	.254***	.236***	.257***	.239***	.254***	.238***
Past Beh.	.268***	.343***	.240***	.328***	.242***	.335***	.246***	.332***	.233***	.341***	.241***	.335***
Desc. Norms	.071	-.052*	.090	-.046	.088	-.052*	.087	-.049	.100*	-.052*	.088	-.050
Personality	-	-	.023	-.002	.072	.006	.038	.002	.034	-.021	.032	.002
P. Sim.	-	-	.015	.074*	-.032	.024	-.029	.050*	-.009	.066*	.010	.063*
P. Favor.	-	-	.215***	.101***	.209***	.101***	.207***	.097***	.210***	.097***	.203***	.089***
P. Sim. x Favor.	-	-	-.016	.012	-.001	-.046	.023	.032	-.054	-.003	-.026	-.001
Adj R^2	.469	.531	.507	.544	.510	.542	.508	.542	.509	.542	.508	.543
R^2 change	-	-	.046***	.015***	.049***	.013***	.047***	.013***	.048***	.013***	.046***	.013***
F value	57.66***	239.94***	34.09***	126.67***	34.46***	125.69***	34.19***	125.59***	34.35***	125.91***	34.11***	125.96***

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Scenario 3 (Pranks)	Step 1		Step 2 with personality trait									
			Extra.		Agree.		Consc.		Emot.		Open	
	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult
Attitudes	.206***	.308***	.211***	.295***	.222***	.310***	.229***	.303***	.204***	.300***	.224***	.306***
Injunc. Norms	.284***	.251***	.170**	.209***	.183**	.202***	.157**	.206***	.166**	.212***	.176**	.201***
Past Beh.	.201***	.080*	.132*	.073*	.151**	.072*	.150**	.068*	.142**	.073*	.142**	.072*
Desc. Norms	.288***	.183***	.213***	.132***	.223***	.135***	.224***	.141***	.213***	.139***	.221***	.114***
Personality	-	-	.117	.175***	.117*	.137***	.147**	.172***	.202**	.111***	.107	.187***
P. Sim.	-	-	.035	.011	.043	.084*	.141**	.096**	-.035	.020	.080	.048
P. Favor.	-	-	.329***	.219***	.319***	.203***	.345***	.198***	.328***	.228***	.308***	.214***
P. Sim. x Favor.	-	-	.034	-.054*	.017	.007	.093	-.080**	.025	-.054*	-.014	-.029
Adj R^2	.329	.325	.439	.416	.435	.404	.448	.410	.452	.395	.445	.426
R^2 change	-	-	.117***	.093***	.113***	.081***	.126***	.087***	.129***	.072***	.122***	.103***
F value	32.55***	102.55***	26.19***	75.93***	25.78***	72.41***	27.12***	74.24***	27.50***	69.66***	26.72***	79.05***

Continued on next page

Scenario 4 (Sexual Communication)	Step 1		Step 2 with personality trait									
			Extra.		Agree.		Consc.		Emot.		Open	
	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult	Adol.	Adult
Attitudes	.202**	.332***	.215***	.331***	.214***	.325***	.219***	.322***	.225***	.330***	.207***	.329***
Injunc. Norms	.138*	.269***	.103	.249***	.095	.240***	.102	.237***	.102	.247***	.081	.242***
Past Beh.	.393***	.367***	.369***	.346***	.378***	.348***	.380***	.348***	.362***	.348***	.395***	.351***
Desc. Norms	-.017	.027	-.015	.023	-.050	.028	-.056	.023	-.024	.026	-.022	.027
Personality	-	-	-.097	-.033	-.079	-.076**	-.146*	-.093***	-.104	-.064**	-.193**	-.060*
P. Sim.	-	-	.027	-.027	.119*	.001	.092	.022	-.012	-.017	.122	.001
P. Favor.	-	-	.188**	.147***	.169**	.150***	.206***	.145***	.189**	.144***	.192***	.149***
P. Sim. x Favor.	-	-	.058	.002	.090	-.007	.121*	.034	.014	-.032	.080	-.010
Adj R^2	.262	.493	.293	.512	.301	.515	.320	.520	.292	.515	.311	.513
R^2 change	-	-	.041**	.021***	.049**	.024***	.068***	.029***	.040***	.024***	.058***	.022***
F value	23.86***	205.82***	14.31***	111.53***	14.83***	112.85***	16.15***	115.11***	14.23***	112.75***	15.49***	111.90***

Note: *** $p<.001$, ** $p<.01$, * $p<.05$. Key: Injun Norms = injunctive norms; Desc. Norms = descriptive norms; Extra = extraversion; Agree = agreeableness; Conscien = Conscientiousness; Emot = emotional stability; P = prototype; Sim = Similarity; Favor = Favorability